Comparison of Instructional Design Models

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An earlier definition, as labeled ‘Educational Technology’ was defined in 2008 by the AECT Definition and Terminology committee that purported that “Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources. (p. 1) The earlier definition, although thorough is unclearly defined. In layman’s terms, what is Instructional design? Is it a technology, a method, a step-by-step process to be followed such as the scientific method?

Dabbagh (2006) sought to define Instructional design through categorizing defining components of the term. She noted that Instructional design is a process requiring analysis of learners’ needs and goals; A discipline involving the development and implementation of design strategies; a science of evaluating and implementing to facilitate learning; a reality of relevant learning experiences; a system of planned execution and adjustment; and a technology as a systemic and systematic approach to instructional design methods.

According toReiser, R., & Dempsey, J. (2012), ***“***The field of instructional design and technology (also known as instructional technology) encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the workplace. “ The authors continue to define the parameters of Instructional technology by exerting that professionals integrate and use ‘systematic instructional design procedures and employ instructional media to accomplish their goals.” (p. 4)

Reiser & Dempsey (2012) did note that with their new definition of the term, two sets of practices have formed which can be derived from both above definitions: the use of media to instruct and systematic instruction. (p.5) The term itself, ‘Instructional design’ does not encompass terminology related to technology, yet the use of technology has been incorporated into the definition of this term and similar terms as the world of technology has grown. As it was noted that most leaders in the field work with media and/or tasks involving systematic instructional methods, the definition is very fitting.

In considering the above definitions and parameters of Instructional Design, as well as the special education students I work with, I would simply state that Instructional Design is simply designing instruction. To discuss the ‘how’ of instructional design would simply elaborate for particular groups and

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individuals, settings and conditions, and learning needs and objectives. In discussing the ‘how’ of instructional design, others have explored the parameters of Instructional Design through the development of systems of instruction through three major categories, which includes Cognitivism, Prescriptive, and Constructivist Models.

Dabbagh (2006) noted that the goal of Cognitivism is to be used as a means for teachers to assist students in collecting and organizing information in a way that students are able to retain it and use it again. Three major steps present in the cognitivist process include sensory memory, short-term memory, and long-term memory. However, Cooper (1998) noted that cognitivist processes included working memory rather than short term memory: Sensory memory occurs when information is perceived through the senses; working memory attends to sensory information through separate channels, with the limited ability to process less than nine sensory inputs at once; long-term memory is used to permanently store processed information, with an unlimited amount for storing information. Trochim (1989) noted that Concept mapping is a general method that can be used to help any individual or group to describe their ideas about some topic in a pictorial form. Using a very structured facilitated approach there are specific steps in order to express and map ideas efficiently. Also, technology use, such as software designed specifically for skill or task attainment, would be a good example of increasing cognitive load into long-term memory. An example of cognitivist instruction would be incorporation of a concept map.

I have used concept mapping for story and reading comprehension, including the use of platforms such as Prezi® for concept development, as a teacher-led activity with student feedback and response. I often see that some students follow the concept-mapped, however those students who have more difficulty in processing information have difficulty following along, even with the visual support of the concept mapping, repetition, clarification, etc. This difficulty is further amplified when attempting to have students attend to teacher support for more student-centric concept mapping. Another cognitivist model-strategy is the use of Advanced Organizers. I would like to use this process whereby cognitively linking new information with old information assists in the storage of new information can be stored more easily in long term memory by using concepts maps, visuals, scenarios, comparisons, etc. Nevertheless, students continue to struggle with processing the information at even the concept mapping level.

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Wilson, B. G., Jonassen, D. H., & Cole, P. (1993) noted that in the traditional view of cognitive instruction where learning occurs in classrooms, students acquire the knowledge and skills needed to perform successfully on the job, but often do not. They noted that Instructional Design models such as the cognitivism model, tend to be carried in a linear fashion, with little retrospect beyond each set of steps. Additionally, when tasks are compartmentalized and portioned into learning groups, isolation of learning further occurs. With a ‘disconnect’ between the learning event(s) and application, student knowledge can be of little use. (p.3) Additionally, with Cooper’s stress on the importance of working memory’s role and limitations, as working memory is significantly limited by capacity and duration, there may be a key here in how this model’s cognitive steps can impede long-term storage learning for those with processing deficits/overload, and even with the cone of experience, needs to be modified for students with special needs. Cooper (1998) notes that “the fundamental tenet of cognitive load theory is that the quality of instructional design will be raised if greater consideration is given to the role and limitations, of working memory. “

The Prescriptive model provides a framework for organizing and structuring the process involved in developing and creating instructional activities. There is not as a rigid linear platform as those found in cognitive instructional designs. This model can be used to guide the instructor’s approach to instructional design. Beyond math word problems, Merrill, M. D., Barclay, M., & Schaak, A. v. (2008) noted that “the most important notion of the first principles is that engaging instruction is problem centered; that is, individual instructional components are most effectively taught in the context of a progression of real-world problems where the student is shown a problem, then taught the components, and then shown how the components are used to solve the problem or do the whole task.” (pp. 175-176) According to Reiser & Dempsey (2012), Merrill (2007, 2009) discusses a set of five prescriptive instructional principles that enhance quality of instruction. These principles include task-centeredness, activation, demonstration, application, and integration: Task-centeredness involves using increasingly complex task-oriented tasks; demonstration denotes that such occur via appropriate media to engage learners and provide generalization of learning; application involves engaging students through collaborative work while correcting feedback and coaching from a teacher-support role with clear objectives in mind; activation involves the recall of relevant learning, sharing knowledge and

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experiences with peers; integration involves the use of reflection, peer-critique, and learner creation of new knowledge learned/experienced. (p.76)

The ADDIE model is one such prescriptive model that involves evaluation throughout the systematic process. Each step builds onto the next in the sequence. It has been mainly used in developing multimedia content. The goal of this Instructional Design model is to thwart problems early on by increasing efficiency. During the five phases of the model formative assessment is essential in the success of model implementation: Analysis requires the developer to consider the learning environment, constraints, etc. while identifying the learning problem and objectives; design involves the consideration of user content and design in order to present specified learning objectives; development considers design phase restraints and capabilities to actually create the content and learning materials; implementation requires that the effectiveness of materials and content be evaluated; evaluation requires formative and summative evaluations to determine the success-outcome of the learning event(s).

In my own instructional language therapy setting, this model could be used to implement an ongoing project that would provide feedback through mostly formative assessments of students’ learning. For example, in understanding language concepts and sequencing, students can be assigned a building project to learn spatial, temporal, and conditional concepts to build a birdhouse. Learning objectives would allow for the development of mini-lessons embedded into the project using visual references and mini-activities as well as project-based activities to support assessment of objectives embedded in the learning event. For my particular population, more frequent teacher and peer-to-peer scaffold feedback must be incorporated to support students in their learning ventures. The prescriptive model of instructional design, however, requires much consideration and fore-planning on the part of the teacher/therapist, and may have to be incorporated through a consortium of teachers/therapists and/or when learning outcomes are most significant for student development and a significant amount standards-content is addressed. There are many variations to the ADDIE model.

The ASSURE model is another prescriptive model that is used to develop the most appropriate learning environment for students and ‘assure’ that learning has occurred. It is beneficial in writing lesson plans and in improving teaching and learning. Incorporating Gagne’s events of instruction, ASSURE requires that learners are analyzed in detail before objectives and learning outcomes are developed. This process is essential in working with students with disabilities, as each student comes

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with his/her own cognitive and/or language deficits. The model also asserts that students need to understand what they are to learn and what is expected of them. Because of time constraints, I can often overlook this step as I am just trying to get the students in a work-mode mindset. However incorporating the communication of standards and IEP objectives to students may assist them in understanding the relevancy and the significance of their attendance to the learning event(s). After selected strategies and technology inclusion is utilized for learner participation, it is essential to evaluate and revise the learning event for future sessions, particularly if students require re-instruction. It would be beneficial; however, if as a county peer-reviews could occur amongst special education instructors/specialists so that improvement and feedback could increase global improvement in instruction county-wide. Otherwise, recording of lessons may prove somewhat beneficial for later review and retrospection.

In my own setting, I would use this model for a shorter activity that could be accomplished in one to two thirty-minute sessions. For example, if I wanted to teach context clues, I would tell them what their task for learning that day and reference the standards context clues are connected to, for their appropriate grade levels. Then, based on my familiarity with the way my students learn, I will have them engaged through their sensory method (e.g. auditory – listening and responding verbally; kinesthetic – writing down information, etc.) through a selected medium to decipher how to use context clues in text for unknown words. At the end, I would evaluate through an individual response activity. It I also essential that I use more feedback during the process to assess student understanding during the steps of instruction, which would provide me with a better analysis of what specific steps in the process particular students are having difficulty with.

When reviewing the cognitivist model, Wilson, B. G., Jonassen, D. H., & Cole, P. (1993) noted that “people learn by introducing elements of work setting-tools, aids, help systems-into manageable and low-risk training environments and that job demands are simulated in controlled training settings,” (p. 21.1) thus a constructivist approach may be conducive to more effective hands-on learning.

Constructivist teaching is often contrasted with “the lecture approach.” Constructivism is a stance toward designing instruction that emphasizes learners’ construction of meaning through collaboration and engagement with authentic problems. Compared to traditional approaches,

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constructivist designs generally require more careful design, performance monitoring, scaffolding, and field testing, in order to provide the needed guidance and support to learners. (p. 45) In chapter 5, Reiser & Dempsey (2012) reference Wilson’s (1993) detailed discussion of constructivism's historic presence in learning. As indicated in chapter four, some believe that constructivist-type assessment learning is ineffective in gauging learning. Upon referencing the basic precepts of constructivism, Wilson notes that "the instructor shifts role from "sage on the stage" to "guide on the side" - still sharing information where needed, but primarily engaging learners in authentic and challenging learning opportunities." (p. 45). After discussing the 'common sense' inherent in constructivism-type learning, difficulty arises in defining what works and even what constructivism really is. She references positive outcomes, such as more authentic and meaningful learning experience as well as some downsides to this type of learning, such as learner responsibility, level of support and design required, and maintaining classroom structure. To a greater degree than other models, the primary benefit of constructivism is its closer match to how people really learn—through direct engagement with their worlds, generally leading to more meaningful learning outcomes.

One example of this model is the Discovery learning process that focuses on active, hands-on

learning opportunities for students. Unlike linear-cognitive and prescriptive-framework models, learning is a dynamic progression of active learning experiences. As cited in Castronova (n.d.), being the basis of technologies such as that of WebQuests, Bicknell-Holmes & Hoffman ( 2000) note that Discovery Learning encompasses three main attributes of discovery learning: exploring and problem solving to create, integrate, and generalize knowledge; student driven, interest-based activities in which the student determines the sequence and frequency; activities to encourage integration of new knowledge into the learner’s existing knowledge base. (p.2)

(Bicknell-Holmes & Hoffman, 2000) also note that true learning flexibility with learning activities is possible and can be incorporated when opportunities exist during the school day when the opportunity is afforded. Although I have not had the opportunity yet to fully use a constructive model in my speech/language therapy sessions, many intermediate teachers in my school incorporate this model through their student-led science and social studies investigations. Students are actively engaged in the learning process and excited about their developing understandings. This attribute contributes greatly to student motivation and ownership of their learning.

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Although I aim to give my students more problem-based constructive opportunities so that they are afforded the opportunity to learn in a more meaningful way, I am not as successful as I would like to be, as I tend to struggle with maintaining the organization and control of their learning outcomes, sometimes due to student motivation, and other times to student cognitive limitations or the need to take excessive data. It can be a real challenge to maintain relevant meaning with these demands and/or constraints, but the need to find a way to do so, I believe, still remains. Incorporation of skills students are comfortable in demonstrating the use of this model with may be beneficial in increasing student comfort with the use of this model for more challenging skill-sets and skills attainment. This modification may find itself of benefit to learners in the regular education setting as well, as students can solidify learning outcomes through a constructivist, student-led model using skills students are confident in as a means of learning how active-engagement ‘learning’ works without as much “sage on the stage.”

Personally, these constructive moments in my own experiences, such as learning about how to crank the lawn mower or press down on the gas and the brake at the same time to move the outhouse with dad’s suburban, are just a minute examples of the repertoire of constructive learning experiences I continue to have the ability to adapt and apply to new and even seemingly unrelated learning goals I have for myself today. I hope that through weaving through instructional design methods, teachers can best utilize instructional design method that is best fitted for each instructional setting, learning outcome, and engagement/attainment of the learner.

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